UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,299	12/19/2000	Yrjo Keranen	4925-95	7221

7590 07/26/2004

Michael C. Stuart, Esq.
Cohen, Pontani, Lieberman & Pavane
Suite 1210
551 Fifth Avenue
New York, NY 10176

EXAMINER	
MEHRPOUR, NAGHMEH	

ART UNIT	PAPER NUMBER
2686	9

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/740,299	KERANEN
	Examiner	Art Unit
	Naghmeh Mehrpour	2686

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-20, are rejected under 35 U.S.C. 103(a) as being unpatentable over Keranen et al. (US Patent 6,681,099 B1) in view of Koch (US Patent Number 6,052,363).

Regarding claim 1, Keranen teaches a method for determining a geographic location of user equipment via a location service server in a wireless network, comprising the steps of:

(a) determining a value of the transmission timing delay of the user equipment (col 3 lines 20-25);

(b) measuring a round trip time of a radio signal between a connected transceiver node and the user equipment (col 3 lines 55-57), wherein the connected transceiver node is in active communication with the user equipment (col 5 lines 1-20);

(d) calculating a distance between the user equipment (UE) and the connected transceiver node and between the user equipment and each of the at least one other transceiver node using the transmission timing delay determined in said step (a) (col 4 lines 52-62); and

(e) determining the location of the user equipment using the distances calculated in said step (d) (col 4 lines 50-62).

Keranen fails to teach a method wherein c) measuring a round trip time of a radio signal between at least one other transceiver node and the user equipment, wherein the at least one other transceiver node is not connected to the user equipment. However Koch teaches a method wherein c) measuring a round trip time of a radio signal between at least one other transceiver node and the user equipment, wherein the at least one other transceiver node is not connected to the user equipment(col 6 lines 4-55). computing the shortest path from a node i to a node j. For entries between non-connected nodes, such as between nodes A and C, the shortest path equals the shortest combination of message latencies from existing paths that can deliver a message between the two nodes. Therefore, all values of P are smaller than + .infin. (there exists at least one path between any two nodes)and greater than -.infin. (no loops exist with a total weight less than zero). However, the values p.sub.i,j do not consider time offset and clock skew, discussed in greater detail, below. The shortest message latency between any two nodes is computed. In the present example, a matrix P of Table 3 is computed using the matrix F of Table 1. For entries between non-connected nodes, such as between nodes A and C, the shortest message latency equals the shortest combination of message latencies using existing paths that can deliver a message between the two nodes. At step 24, an offset which can be used to deliver a message s in causal order is created. In this example, an offset matrix O of Table 4 is created by combining the matrixes P and G. The matrix O shows the offsets that any receiver node R of a message s can add to the time-stamp t.sub.h coming from the third node H. The values o.sub.H,s are calculated by using equation (3') and are independent of the receiver node R. Therefore, having only positive elements in matrix P that are greater than the corresponding clock skew between two nodes, none of the entries in matrix

0 of Table 4 is less than zero (col 6 lines 14-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the above teaching of Koch with Keranen, in order to allow a node to provide a casual ordered response immediately after receiving the message from the second node. In the remaining instances, the amount of the time the first node must wait before it can respond is significantly reduced.

Regarding claim 2, Keranen teaches a method wherein said step (a) comprises determining the transmission timing delay by using the connected transceiver node to query the user equipment (col 4 lines 30-51).

Regarding claim 3, Keranen teaches a method wherein said step (a) comprises determining the transmission timing delay by setting the transmission timing delay to equal a default value T.sub.0 (col 2 lines 12-25).

Regarding claim 4, Keranen teaches a method comprising the step of requesting a connection between the user equipment and a selected transceiver node before said step (a) if the user equipment is not connected to any transceiver node (col 4 lines 9-15, when the UE handoffs to the new node, it connects to the new node and disconnect from the old node), and connecting the selected transceiver node with the user equipment so that the selected transceiver node comprises the connected transceiver node (col 4 lines 9-19).

Regarding claim 5, Keranen inherently teaches a method wherein said step of requesting a connection comprises requesting, by the selected transceiver

3node, a return trip time measurement via a random access channel to connect the user equipment to the selected transceiver node. Examiner explains that when a mobile attempts to access a system, however, such propagation delay information typically is unavailable (the node is not connected). Accordingly, conventional time-division-multiplexed systems commonly utilize a random access channel_(RACH) to receive an access request burst from the mobile unit and use propagation delay gained from the received RACH burst to determine an appropriate timing advance for the terminal. Upon powering up or handoff to a new base station, the mobile searches for and receives a control channel from the base station that provides an initial timing reference. To initiate use of the base station, the mobile unit then transmits a RACH burst at a predetermined time in relation to the control channel timing reference. Upon receipt of the RACH burst, the base station can determine round-trip time delay based on the delay between the transmission of the control channel timing reference and the receipt of the RACH burst. The base station uses this round-trip time delay to determine an appropriate timing advance for the mobile unit (see cited reference Asokan US Patent Number 6,663,559).

Regarding claim 6, Keranen teaches a method wherein said step (c) comprises comparing a time-of-arrival of an uplink transmission from said UE at the non-connected (see rejection of claim 5) transceiver nodes to the time-of-arrival of the uplink transmission at the connected transceiver node, and determining the propagation time of each of the non-connected transceiver nodes (see claim 5, for non-connected node) therefrom (col 5 lines 5-25).

Regarding claim 7, Keranen fails to teach a method wherein c) measuring a round trip time of a radio signal between at least one other transceiver node

and the user equipment, wherein the at least one other transceiver node is not connected to the user equipment. However Koch teaches a method wherein c) measuring a round trip time of a radio signal between at least one other transceiver node and the user equipment, wherein the at least one other transceiver node is not connected to the user equipment(col 6 lines 4-55). computing the shortest path from a node i to a node j. For entries between non-connected nodes, such as between nodes A and C, the shortest path equals the shortest combination of message latencies from existing paths that can deliver a message between the two nodes. Therefore, all values of P are smaller than + .infin. (there exists at least one path between any two nodes)and greater than -.infin. (no loops exist with a total weight less than zero). However, the values p.sub.i,j do not consider time offset and clock skew, discussed in greater detail, below. The shortest message latency between any two nodes is computed. In the present example, a matrix P of Table 3 is computed using the matrix F of Table 1. For entries between non-connected nodes, such as between nodes A and C, the shortest message latency equals the shortest combination of message latencies using existing paths that can deliver a message between the two nodes. At step 24, an offset which can be used to deliver a message s in causal order is created. In this example, an offset matrix O of Table 4 is created by combining the matrixes P and G. The matrix O shows the offsets that any receiver node R of a message s can add to the time-stamp t.sub.h coming from the third node H. The values o.sub.H,s are calculated by using equation (3') and are independent of the receiver node R. Therefore, having only positive elements in matrix P that are greater than the corresponding clock skew between two nodes, none of the entries in matrix O of Table 4 is less than zero (col 6 lines 14-55). Therefore, it would have been obvious to one of ordinary skill in the art at

the time of the invention to combine the above teaching of Koch with Keranen, in order to allow a node to provide a casual ordered response immediately after receiving the message from the second node. In the remaining instances, the amount of the time the first node must wait before it can respond is significantly reduced.

Regarding claims 8,18, Keranen teaches a method wherein said step (e) comprises determining the user equipment location by mathematically generating a circle around the connected transceiver node and each of the at least two other transceiver nodes (col 5 lines 25-34), wherein the radius of each circle is the distance of the user equipment to the respective transceiver node determined in said steps (c) and (d), and determining an intersection of the circles (col 5 lines 34-35).

Regarding claim 9, Keranen teaches a method wherein said step of determining the intersection of the circles comprises iteratively increasing or iteratively decreasing the radii of each of the circles until an intersection point is determined (col 5 lines 54-67, col 6 lines 1-8). There are certain situations when the UE timing difference t3-t2 may be different from the defined value. These situations occur When the UE is moving toward or away from a node or BTS, the propagation paths are varying, and there is a soft handover in which a UE is switched from one cell to another (col 4 lines 1-15). Therefore, for determining the intersection of the circles comprises iteratively increasing or iteratively decreasing the radii of each of the circles until an intersection point is determined.

Regarding claim 10, Keranen teaches a method wherein said step (e) comprises determining the user equipment location by mathematically generating a circle around the connected transceiver node and each of the at least one other transceiver node (col 5 lines 25-34), wherein the radius of each circle is the distance of the user equipment to the respective transceiver node determined in said step (d) (col 5 lines 25-34), and determining an angle of arrival radio steps (col 5 lines 53-67, col 6 line 1), and
(d) at the connected transceiver node and the at least one other transceiver node (col 6 lines 1-3).

Regarding claim 11, Keranen teaches a method wherein said step (b) further comprises determining a sector of the area of coverage of the connected transceiver node in which the user equipment is located (col 5 lines 54-62).

Regarding claim 12, Keranen teaches a method wherein said step (c) further comprises searching, by the at least one other transceiver node (base station), within the sector determined in said step (b) (col 5 lines 58-67, col 6 lines 1-8). Examiner explains that when a mobile attempts to access a system. Accordingly, conventional cellular system searching for a new node /new base station upon powering up or handoff to a new base station, the mobile searches for and receives a control channel from the base station.

Regarding claim 13, Keranen teaches a method wherein said steps (a)-(e) are performed in response to receiving a request for the location of a user equipment (col 4 lines 30-51).

Regarding claim 14, Keranen teaches a wireless communication system comprising a core network (col 3 lines 20-25),

a plurality of radio network controllers (col 3 lines 36-39),

a plurality of wireless transceiver nodes for communicating with a user equipment located in a geographical area supported by said transceiver nodes (col 3 lines 29-36), and

a location services server for determining a location of the user equipment (Mobile terminal), said location services server (col 3 lines 20-25) comprising:

means for determining a round trip time for a radio signal from between a user equipment and a connected transceiver node in communication with the user equipment including means for measuring a time from a beginning of transmission of a downlink transmission signal from the connected transceiver node to the reception of an uplink transmission signal from the user equipment to the connected transceiver node in response to the downlink transmission signal (col 3 lines 62-65);

means for determining a round trip time between the user equipment (UE) and at least one other non-connected transceiver node, which is not in communication with the user equipment (col 4 lines 2-5). The time difference t3-t2, are the time that UE requires between receiving the downlink transmission and transmitting the uplink at this time node is not in communication with the UE yet;

means for determining a location of the user equipment from the distances of the user equipment from each of the nodes (col 4 lines 2-51). Keranen fails to teach a method wherein measuring a round trip time of a radio signal between at least one other transceiver node and the user equipment, wherein the at least one other transceiver node is not connected

to the user equipment. However Koch teaches a method wherein c) measuring a round trip time of a radio signal between at least one other transceiver node and the user equipment, wherein the at least one other transceiver node is not connected to the user equipment(col 6 lines 4-55). computing the shortest path from a node i to a node j. For entries between non-connected nodes, such as between nodes A and C, the shortest path equals the shortest combination of message latencies from existing paths that can deliver a message between the two nodes. Therefore, all values of P are smaller than + .infin. (there exists at least one path between any two nodes)and greater than -.infin. (no loops exist with a total weight less than zero). However, the values p.sub.i,j do not consider time offset and clock skew, discussed in greater detail, below. The shortest message latency between any two nodes is computed. In the present example, a matrix P of Table 3 is computed using the matrix F of Table 1. For entries between non-connected nodes, such as between nodes A and C, the shortest message latency equals the shortest combination of message latencies using existing paths that can deliver a message between the two nodes. At step 24, an offset which can be used to deliver a message s in causal order is created. In this example, an offset matrix O of Table 4 is created by combining the matrixes P and G. The matrix O shows the offsets that any receiver node R of a message s can add to the time-stamp t.sub.h coming from the third node H. The values o.sub.H,s are calculated by using equation (3') and are independent of the receiver node R. Therefore, having only positive elements in matrix P that are greater than the corresponding clock skew between two nodes, none of the entries in matrix O of Table 4 is less than zero (col 6 lines 14-55).Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the above teaching of Koch with Keranen, in order to allow a node

to provide a casual ordered response immediately after receiving the message from the second node. In the remaining instances, the amount of the time the first node must wait before it can respond is significantly reduced.

Regarding claims 15,17, Keranen teaches a wireless communication system wherein said means for determining a round trip time between the user equipment and plurality of other non-connected transceiver node comprises means for receiving an uplink transmission signal from the user equipment at the at least one other non-connected (during the handoff) transceiver node which is not in active communication with the user equipment and means for comparing the reception times at the at least one other non-connected transceiver node with the reception time at the connected transceiver node (col 3 lines 38-57, col 4 lines 2-22).

Regarding claim 16, Keranen teaches a wireless communication system further comprising means for determining an angle of arrival (AOA) of transmission signals at the connected transceiver node in active communication and the at least one other transceiver node (col 5 lines 65-67, col 6 lines 1-9).

Regarding claim 19, Keranen teaches a wireless communication system further comprising means for determining whether the radii determined are one of too large and too small (col 4 lines 9-22, col 5 lines 25-35). In order to generate a circle around each of the active nodes and calculates the intersection of the circles, when the UE is moving toward or away from the node or BTS the propagation path are varying, and there is a soft handover in which UE is switched from one cell to another. During the movement of the UE toward or away from the BTS the propagation delay between t1 and t2 changes.

The amount that t3 can change in each increment is limited, if the movement is too fast, the UE is prevented from adjusting the t3 time fast enough because of the increment limit. Therefore, the radius that determined at t3 is either too small or too large.

Regarding claim 20, Keranen teaches a wireless communication system wherein said means for determining a location comprises means for iteratively decreasing the radii until an intersection point of the circles is found when the radii are too large and means for iteratively increasing the radii until an intersection point of the circles is found when the radii are too small (col 5 lines 25-35). There are certain situations when the UE timing difference t3-t2 may be different from the defined value. These situations occur When the UE is moving toward or away from a node or BTS, the propagation paths are varying, and there is a soft handover in which a UE is switched from one cell to another (col 4 lines 1-15). Therefore, during the process of determining an intersection of the circles, the radius of the circles are either too large or too small until the exact point of the intersection of the circles is found.

Response to Arguments

3. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

4. **Any responses to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9306, (for formal communications indented for entry)

Or:

(703) 308-6306, (for informal or draft communications, please label □PROPOSED□ or □DRAFT□)

Hand-delivered responses should be brought to Crystal Park II. 2121 Crystal Drive, Arlington. Va., sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Melody Mehrpour whose telephone number is (703) 308-7159. The examiner can normally be reached on Monday through Thursday (first week of bi-week) and Monday through Friday (second week of bi-week) from 6:30 a.m. to 5:00 p.m.

If attempt to reach the examiner are unsuccessful the examiner's supervisor, Lester Kincaid be reached (703)306-3016.

NM

July 16, 2004

MELODY MEHRPOUR
PATENT EXAMINER

NMehrpour